Published in final edited form as:

J Soc Clin Psychol. 2011 June ; 30(6): 599–615. doi:10.1521/jscp.2011.30.6.599.

Putting the relationship between social anxiety and alcohol use into context: A daily diary investigation of drinking in response to embarrassing events

Megan A. O'Grady¹, Jerry Cullum¹, Stephen Armeli², and Howard Tennen¹

¹University of Connecticut Health Center

²Fairleigh Dickinson University

Abstract

The goal of this study was to clarify mixed findings regarding the association between dispositional social anxiety and drinking among college students by using a daily diary method to examine whether a within-person social-contextual event moderated the relationship between social anxiety and alcohol use. College students ($n = 476$) completed a measure of dispositional social anxiety and then for 30 days reported whether they experienced an embarrassing event in public and the amount of alcohol they drank each day. We examined whether experiencing an embarrassing event moderated the relationship between dispositional social anxiety and alcohol use for same-day, same-evening, next-day, and next-evening drinking. While there was a positive relationship between dispositional social anxiety and alcohol use on evenings when an embarrassing event occurred earlier that day, this appeared to be driven by a reduction in drinking among those low in social anxiety. Individuals with high social anxiety drank in the evening regardless of embarrassing event occurrence. Results suggest that people with low social anxiety show an adaptive response to embarrassing events by lowering drinking on such evenings, while those with high social anxiety may drink to reduce their already high levels of anxiety independent of daily social events.

Keywords

social anxiety; alcohol use; embarrassment; daily diary

Despite considerable research on social anxiety and alcohol consumption, few clear conclusions can be drawn as to the influence of social anxiety on drinking behavior. For example, among nonclinical college student populations, findings are inconsistent, with some research suggesting a positive relationship, some suggesting a negative relationship, and some finding no relationship between social anxiety and alcohol use (Morris, Stewart, & Ham, 2005). Social anxiety issues are common among college students and can hinder social functioning (Burke & Stephens, 1999; Tran, Haaga, & Chambless, 1997). Heavy alcohol use is also prevalent among college students, and has been linked to a variety of negative health consequences (e.g., drunk driving, unprotected sex; Hingson, Zha, & Weitzman, 2009). We sought to clarify the conditions under which a relationship between social anxiety and drinking may exist.

One promising method that may offer additional insight in this literature is a daily process approach. Such an approach captures day to day experiences as they unfold in the natural environment and allows for the examination of relationships of interest at multiple levels of analysis (Bolger, Davis, & Rafaeli, 2003; Tennen, Affleck, & Armeli, 2003). In the present study, we examined how experiencing a negative social event may modify the relationship between dispositional social anxiety and alcohol use. By taking such contextual daily factors into account, we hoped to clarify some of the inconsistent findings in the literature.

Social Anxiety

Socially anxious people tend to believe they are undesirable to others, unable to make positive impressions on others, and that their own actions will lead to embarrassment and social rejection (Arkin, 1981; Kashdan & Steger, 2006; Miller, 1995). These social fears and low expectations regarding impression management efficacy can make socially anxious individuals particularly sensitive to social threat and can lead them to interpret social feedback more negatively than their less socially anxious counterparts (Leary, Kowalski, & Campbell, 1988). In addition, people with elevated social anxiety are preoccupied with impression management, and may ruminate about social interactions in which they believe something went wrong by dwelling on fears of being rejected and perceived negative feedback (Clark & Wells, 1995; Kashdan & Roberts, 2007; Leary, 2004). Socially anxious individuals may be less savvy at responding to and recovering from social threats, and they experience amplified anxiety in socially threatening situations (Kashdan & Roberts, 2004; Kashdan & Steger, 2006). In a daily study of social anxiety and everyday mood, Kashdan and Collins (2009) demonstrated that dispositional social anxiety was associated with less time spent experiencing positive mood, and more time spent feeling angry throughout the day. This suggests that dispositional levels of social anxiety may affect day to day functioning.

The Relationship between Social Anxiety and Alcohol Use

One predominant mechanism posited to underlie the link between social anxiety and alcohol use is tension-reduction (Conger, 1956). According to this model, social anxiety should be positively related to alcohol use because alcohol reduces anxiety which, in turn, reinforces drinking in similar situations. However, support for this association is inconsistent among college student populations. For example, several correlational studies have found that as compared to non-problem drinkers, problem drinking students had higher scores on social-anxiety related measures (e.g., Buckner, Schmidt, & Eggleston, 2006; Lewis & O'Neill, 2000). Similarly, in an experimental study, Kidorf and Lang (1999) found that individuals with high dispositional social anxiety drank more alcohol prior to an anxiety provoking social situation (a self-disclosing speech) than those with low social anxiety. However, contradictory findings have been reported. For example, Eggleston, Woolaway-Bickel, and Schmidt (2004) found that social interaction anxiety was negatively related to drinking frequency; similar findings have been reported in multiple correlational studies (e.g., Ham, Bonin, & Hope, 2007; Ham & Hope, 2005; Stewart, Morris, Mellings, & Komar, 2006). Further, in an experimental "party" situation, nonsocially anxious participants drank more than socially anxious participants during an informal get together (Holroyd, 1978). Similar inconsistencies in the relationship between social anxiety and alcohol use have been found among clinical samples (see Carrigan & Randall, 2003; Morris et al., 2005).

The social context proximal to drinking episodes might have an important influence on the relationship between social anxiety and alcohol use. For example, different social situations could affect whether and how much alcohol use occurs among individuals with low or high levels of dispositional social anxiety (Morris et al., 2005; Thomas, Randall, & Carrigan,

2003). Lab-based studies have focused on situations that increase social anxiety (rather than only dispositional social anxiety, as in many correlational studies), yet they tend to be rather artificial situations that often confound social stressors with performance stressors (e.g., giving a speech; Carrigan & Randall, 2003). Therefore, it is unclear how socially threatening situations in college students' daily environments may trigger drinking and how those low vs. high in social anxiety may react differently to such threats.

The possibility that social-contextual variables moderate the relationship between dispositional social anxiety and alcohol use suggests the need to focus on within-person processes in addition to differences that occur between people. Such multiple levels of analysis are not adequately captured by traditional between-person designs. For example, daily diary methods can take into account how a particular person with high dispositional social anxiety drinks in relation to her or his usual drinking levels in reaction to anxiety-evoking social situations. In contrast, cross-sectional, between-person designs only inform us about interindividual variability (e.g., do people with high social anxiety also have high levels of alcohol use). In such designs it is possible that results are due to confounding person-factors (e.g., the negative relationship between social anxiety and drinking is due to those with high social anxiety withdrawing from social situations). Even two or three wave longitudinal designs cannot adequately address how such processes play out within the context of daily life. Therefore, the need to focus on within-person processes that may moderate between-person differences makes the use of daily process methods particularly compelling. Using a daily reporting procedure, studies have tested how anxious mood affects drinking (Swendsen et al., 2000) or measured social anxiety related to patterns of daily and weekly drinking (Rohsenow, 1982). To our knowledge, none have investigated how negative social events in the context of normal daily life may affect the relationship between dispositional social anxiety and alcohol use. Such an approach may address some of the mixed findings in the literature and provide a more comprehensive account of the relationship between social anxiety and drinking given that much of the social anxiety-alcohol literature has been cross-sectional (Burke & Stephens, 1999).

The Current Study

In the current study, we take a daily diary approach to studying the relationship between social anxiety and alcohol use. We examined one type of negative social event that may be particularly relevant to social anxiety – embarrassment in public. Experiencing an embarrassing event may be especially detrimental to individuals with elevated levels of social anxiety because embarrassing situations likely amplify concerns about making desirable impressions on others and achieving social acceptance (Leary, 2000; Leary 2007). Consistent with this notion, we predicted that a positive relationship between social anxiety and alcohol use would exist only on days when embarrassing events occurred.

In an exploratory fashion we examined drinking at several time-points (e.g., same-day, same evening, next-day, next evening) after the embarrassing event occurred. Drinking to reduce anxiety related to a negative social event could occur shortly after the event (e.g., same day/ daytime) in efforts to immediately reduce negative emotion associated with that event. However, it is possible that practical issues (e.g., attending classes) may delay drinking in relation to a social stressor to periods (e.g., later that evening) when it is more socially appropriate and alcohol is more readily available. Further, social anxiety-related drinking may occur at even later time-periods (e.g., next day, or next evening) because the effects of a social anxiety-inducing event may linger after that event is over. For example, individuals with high social anxiety have been found to ruminate more and have more negative affect in the 24-hour period following a social interaction task (Kashdan & Roberts, 2007; Mellings & Alden, 2000). This suggests that social anxiety may lead to social and psychological

deficits not only during social situations, but also within the day following social situations perhaps due to excessive negative rumination about the events and self-presentation concerns.

Method

Participants

Of the 574 students who began the study, 70 were excluded because they completed less than 15 days of the diary data, 22 due to incomplete data from the initial assessment, and 6 because they refrained from drinking during the entire diary period. This left the final sample at 476 (227 men, 249 women; Mean age: 18.73, $SD = 1.08$). They were mainly freshmen (56%) or sophomore (34%) students who were White (86%) with the remainder being Asian/Pacific Islander (6%), Black/African American (4%), Latino/Hispanic (3%) or other (1%). There were no differences in social anxiety scores ($t = .66, p = .51$), or age ($t = -.36, p = .72$), for those included versus those excluded. However, a larger proportion of men were excluded than women, ($\chi^2(1) = 6.89, p = .01$). The 476 participants provided 11,934 days of data, i.e., a compliance rate of 84% with the daily diary protocol (mean number of days completed per participant = 25.11, $SD = 3.82$).

Procedure

Participants were recruited from an introductory psychology subject pool to take part in a larger study of daily experiences and health behaviors. Over 3000 students of diverse majors enroll in introductory psychology every academic year. The subject pool participants during recruitment for this study were similar to the overall student body in SAT scores and ethnic make-up. Participants first attended an information session where they provided consent and were instructed on how to complete an Internet-based initial assessment and the daily survey. Within a week of this session, students completed the initial assessment which included demographic and personality measures by logging onto a secure website. Approximately two weeks after completing the initial assessment, participants began the daily diary procedure. They used a secure website to complete a daily survey between 2:30pm and 7:00pm for 30 days which took about 5 minutes. To improve compliance with the daily surveys, participants received daily e-mail reminders. At the end of the 30 days, participants attended an exit session and received course credit and monetary compensation.

Materials

Initial assessment—During the initial assessment phase, in addition to demographic questions, participants completed the social anxiety subscale of the Self-Consciousness Scale. This scale measures the extent to which participants are fearful of being evaluated by others (Fenigstein, Scheier, & Buss, 1975) and has been used in other studies of social anxiety (e.g., Kashdan & Collins, 2009; Neighbors et al., 2007). Participants completed this 6-item subscale using a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*; e.g., It takes me time to overcome my shyness in new situations). Scores were summed (Cronbach $\alpha = .82$) and ranged from 6 – 42 ($M = 23.51, SD = 7.47$). The subscale has good test-retest reliability ($r = .73$; Fenigstein et al., 1975) and as evidence for validity, it predicts poor social performance (e.g., Reno & Kenny, 1992) and is unrelated to private self-consciousness (Fenigstein et al., 1975).

Daily measures—During the daily diary phase, each day participants reported whether they had experienced something that made them feel awkward or embarrassed in public (yes = 0, no = 1). To measure day and evening alcohol use, participants indicated how many alcoholic drinks they had the night before (after the previous day's survey) as well as during the day (from the time they woke up until the time they completed the survey). They

answered these questions on a scale from 0 to 15, and > 15 (coded 16). Each day, an alcoholic drink was defined for participants as equal to one 12-oz. can or bottle of beer, one 5-oz. glass of wine, one 12-oz. wine cooler or 1.50-oz. of liquor straight or in a mixed drink. Discrete events such as number of drinks consumed can be measured the next day fairly reliably (e.g., Reis & Gable, 2000; Shiffman, 2000).

Results

Descriptive Statistics for Daily Measures

An embarrassing event occurred on 7% of total study days and 61% of participants reported experiencing an embarrassing event at some point over the 30 diary days. Across all study days, participants drank a mean of 1.25 ($SD = 3.04$) drinks in the evening, and .13 ($SD = 1.04$) during the day. However, participants drank a mean of 5.95 drinks ($SD = 3.97$) on average per drinking evening and 4.79 ($SD = 4.33$) per drinking day. Overall, participants drank on 16% of total study days. Preliminary analyses suggested the embarrassing events occurred more often on weekends (i.e., Friday and Saturday) compared to weekdays, ($OR = 1.24, p = .01$). Level of social anxiety did not predict whether embarrassing events were reported each day ($OR = 1.01, p = .13$).

Statistical Analysis

We conducted multilevel modeling with days (Level 1) nested within people (Level 2) using Hierarchical Linear Modeling software (v. 6.06; Raudenbush, Bryk, & Congdon, 2008). Because our outcome variables (number of drinks) were counts, we used the hierarchical generalized linear model option (Raudenbush & Bryk, 2002) to specify a Poisson distribution sampling model with a log-link function and overdispersion. Such models are more appropriate when examining rare events with distributions that are very positively skewed (Cohen, Cohen, West, & Aiken, 2003). In all analyses, continuous Level 2 variables were grand mean-centered. Four outcome variables were investigated: same-day daytime drinking, same-day evening drinking, next-day daytime drinking, and next-day evening drinking.

To model the association between embarrassing events reported on day t and evening drinking, next day drinking, and next evening drinking, we lagged the appropriate drinking values reported on days $t + 1$ and $t + 2$. This matching procedure reduced the possible number of study days per person to 29 for evening drinking and next day drinking and 28 for next evening drinking. Gender was included as a control variable because it is related to social anxiety and drinking and it has been suggested that the relationship between social anxiety and alcohol may differ for men and women (e.g., Morris et al., 2005)¹. Year in school (e.g., freshmen) has been found to affect drinking patterns (e.g., McCabe, 2002; NIH, 2002) and therefore was included as an additional control variable. A day of week variable was included as a control in all models tested (0 = weekday, 1 = weekend) as there were day of week trends in both event occurrence and drinking.

Social Anxiety and Alcohol Use

Intercept-only models were estimated to determine whether dispositional social anxiety was associated with average levels of drinking. Results suggested that level of dispositional social anxiety was not related to average daily drinking for the same day ($b = -.01, p = .38$),

¹An interaction between gender and social anxiety was included in the models at Level 2 for exploratory purposes; however it was not significant for any models. In addition, although the analyses controlled for gender, they did not control for gender differences in alcohol metabolism. Women require less alcohol to reach blood alcohol levels comparable to men.

same evening ($b = .00, p = .73$), next day ($b = .01, p = .77$), or next evening ($b = .00, p = .54$).

The Interactive Effect of Social Anxiety and Embarrassing Events in Predicting Alcohol Use

We next tested whether daily embarrassment moderated the effect of social anxiety on daily alcohol use. Specifically, we included the dummy coded embarrassing event variable in the Level 1 portion of the model and specified the cross-level interaction between embarrassing events and social anxiety levels. The Level 1 intercepts and slopes were both treated as random effects.

As noted in Table 1, there was a significant cross-level interaction between embarrassing event and social anxiety only for same evening drinking. None of the variables were significant for any other drinking time-point. The interaction is depicted in Figure 1; drinking values are exponentiated for ease of interpretation. We report Event Rate Ratios (ERRs) as a measure of relative effect size, which are similar to Odds Ratios, and can be interpreted as the change in frequency of events occurring (e.g., an ERR of 1.5 would indicate that a 1 point increase in the independent variable increases the number of drinks occurring each day by 50%). On days with embarrassing events, there is a positive relationship between social anxiety and evening drinking ($b = .02, \text{ERR} = 1.02, p = .09$), indicating that a one point increase in social anxiety increased the number of evening drinks on each embarrassing event day by 2%; however, on days when an embarrassing event did not occur, the relationship between social anxiety and evening drinking was not significant ($b = .00, \text{ERR} = .99, p = .79$). To further interpret the nature of this cross-level interaction, we conducted simple slopes tests of the effects of an embarrassing event when social anxiety was low and high. Thus, we re-tested the model by re-centering social anxiety to represent both low (1 *SD* below the mean) and high (1 *SD* above the mean) levels. As Figure 1 suggests, for students with high dispositional social anxiety, there was no difference in evening drinking based on embarrassing event occurrence ($b = .01, \text{ERR} = 1.01, p = .93$). However, for those with low dispositional social anxiety, evening drinking was significantly less when an embarrassing event occurred, than when no event occurred ($b = .31, \text{ERR} = 1.36, p = .05$). Therefore, on days when an event did not occur, evening drinking increased by 36% for those with low social anxiety (as compared to an increase by only 1% for those with high social anxiety).

Discussion

The goal of this study was to investigate the relationship between dispositional social anxiety and alcohol use by examining how the social stressor of embarrassment may affect this relationship. In this study, dispositional social anxiety was unrelated to average drinking, as has been found in previous work (Morris et al., 2005). However, the between-person association between social anxiety and drinking appears to be moderated by the within-person experience of embarrassment.

It was hypothesized that a positive relationship would exist between social anxiety and alcohol use on days only when an embarrassing event occurred. Although this between-person association between social anxiety and drinking was positive for evening drinking on days when an embarrassing event occurred, this association appears to be driven by reductions in drinking among individuals with low social anxiety. Interestingly, participants with low social anxiety drank more on evenings when an embarrassing event did not occur, as compared to days when such an event did occur, with over a 30% difference in the amount of alcohol consumed between the day types. This finding is consistent with research indicating that individuals with low levels of social anxiety display low levels of drinking to

cope motivation, and instead drink more often to enhance positive feelings (Ham et al., 2007). It is also possible that such individuals have other ways of coping with embarrassing social events (e.g., problem-focused strategies to ameliorate the problem) and therefore appear to be showing an adaptive response on days when they experienced an embarrassing event by reducing their drinking. Even though college students may drink with peers as a way to make a positive impression on them, these attempts often backfire as a result of doing something embarrassing while drinking (e.g., Martin & Leary, 2001). People with low social anxiety may be concerned that drinking heavily may lead to engagement in further embarrassing behavior, making reduction of alcohol use an effective strategy for avoiding even more embarrassment.

In contrast, individuals with high social anxiety do not seem to reduce (or increase) their drinking on embarrassing days. One possible interpretation of this finding is that, consistent with tension reduction explanation of drinking, people with high social anxiety use drinking to cope with their already high levels of anxiety regardless of negative event occurrence. In other words, they are at risk for drinking regardless of what is happening day to day, suggesting that they may have developed expectancies for alcohol to reduce social anxiety due to consistent feelings of high social anxiety in social situations. This may provide some explanation for why problem drinking students have been found to have higher scores on social anxiety-related measures (e.g., Buckner et al., 2006). From a clinical standpoint, it appears that changing positive expectancies about alcohol may assist students in decreasing alcohol use, but the type of expectancy to target may differ based on level of dispositional social anxiety; mood enhancement expectancies may be potentially important for those with low social anxiety, whereas tension reduction and social assertiveness may be important for those with high social anxiety. However, more research examining how people with low and high social anxiety form alcohol expectancies over time (e.g., several years) and how this affects their drinking patterns would assist in examining this possibility.

Social anxiety is often conceptualized as sensitivity to the experience of threatening social events which should result in a lower threshold in determining whether an event is embarrassing, a greater reactivity to such events when they occur, or both. In this study, we did not find evidence to support these conceptualizations. Instead, we found that level of social anxiety was unrelated to whether embarrassing events were reported, and no evidence that students high in social anxiety consumed more alcohol on days that included an embarrassing encounter. It is possible that individuals with high social anxiety are actually more likely to perceive that they have embarrassed themselves, but that they avoid social interactions, making it appear that there is no relationship between level of social anxiety and embarrassment experience. Future research should investigate this possibility.

Strengths and Limitations

This study has several strengths and contributes further to the understanding of the relationship between alcohol use and social anxiety. For example, our study methods allowed us to examine the influence of within-person experiences on individual differences in social anxiety, rather than utilizing strictly nomothetic methods which have left the literature unclear. It also allowed us to investigate the timing issues of alcohol use and behavior in a more naturalistic setting which cross-sectional or lab-based studies have been criticized for failing to do (e.g., Carrigan & Randall, 2003).

However, there are several limitations that should be noted. In this study, we collected information about embarrassing experiences that occurred during the day, and not those that occurred in the evening. Therefore, we are unable to determine if experiencing an embarrassing event during the evening may have resulted in drinking closer in time to the event (e.g., during that same evening). In addition, this study focused mainly on assessing

drinking after embarrassing event occurrence, however, research also suggests that individuals may drink in anticipation of or during social situations (e.g., Kidorf & Lang, 1999; Thomas et al., 2003). While in one model we did assess drinking during the same day as the embarrassing event, it is unclear whether this drinking occurred prior to, during, or after the social event; future examinations may benefit from a focus on drinking prior to and during such events. Further, there was a low base-rate for embarrassing event occurrence; we may have had more robust findings with a longer sampling period or more comprehensive and inclusive assessment of such events. Finally, while our findings contribute to the social anxiety-drinking literature, they are only applicable to college students with nonclinical levels of social anxiety.

Future Directions

In this study, the significant interaction between social anxiety and embarrassing event occurrence was only evident during the evening on the same day the event occurred. This suggests that timing of the measurement of drinking related to social event occurrence may be an important future direction. Future research using more intensive sampling strategies (e.g., hourly) and comprehensive assessment of the constructs of interest is needed to adequately test why and how students may delay drinking in relation to negative social events. Embarrassment may occur as a result of many different experiences (Leary, 2007), with varying degrees of short and long-term negative social consequences. We did not measure whether the embarrassing events were perceived to be a result of participants' own actions or someone else's, and did not collect information regarding the frequency, type, or duration of the events. We also only asked participants to report public events; however, events perceived as private could also potentially lead to increased social anxiety (e.g., a phone call). Therefore, gathering more information about the events themselves, as well as assessing attributions about the event (internal attributions would be more pertinent to social anxiety) and both public and private events would be useful in future research. Collecting more information about the events would assist in determining whether individuals low and high in social anxiety differed in the types of embarrassing events they were reporting and if the events may be alcohol-related in some way. Finally, because drinking differed based on embarrassing event occurrence only among participants with low social anxiety, future research should examine how those with high and low social anxiety differ in drinking motives and ways of dealing with negative social events in order to determine how this affects drinking behavior.

Conclusion

We sought to assist in clarifying mixed findings regarding the association between dispositional social anxiety and drinking among college students by using a daily diary method. Such methods provide for a strong test of how drinking and social anxiety may be related by including natural events that occur within the context of a normal daily environment. We found that college students with high social anxiety drank regardless of embarrassing event occurrence, whereas those with low social anxiety drank more on days in which they did not experience an embarrassing event. Overall, this study offers a unique glimpse into how people with low and high social anxiety differ in their reactions to events that threaten their social image.

Acknowledgments

Funding for this study was provided by NIAAA Grants T32-AA007290 and P50-AA03510

References

- Arkin, RM. Self-presentational styles. In: Tedeschi, JT., editor. *Impression management theory and social psychological research*. New York: Academic Press; 1981. p. 311-333.
- Bolger N, Davis A, Rafaeli E. Diary methods: Capturing life as it is lived. *Annual Review of Psychology*. 2003; 54:579–616.
- Buckner JD, Schmidt NB, Eggleston AM. Social anxiety and problematic alcohol consumption: The mediating role of drinking motives and situations. *Behavior Therapy*. 2006; 37:381–391. [PubMed: 17071215]
- Burke RS, Stephens RS. Social anxiety and drinking in college students: A social cognitive theory analysis. *Clinical Psychology Review*. 1999; 19:513–530. [PubMed: 10467489]
- Carrigan MH, Randall CL. Self-medication in social phobia: A review of the alcohol literature. *Addictive Behaviors*. 2003; 28:269–284. [PubMed: 12573678]
- Clark, DM.; Wells, A. A cognitive model of social phobia. In: Heimberg, RG.; Liebowitz, MR.; Hope, DA.; Schneier, FR., editors. *Social Phobia: Diagnosis, assessment, and treatment*. New York: Guilford Press; 1995. p. 69-93.
- Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Mahwah, New Jersey: Laurence Erlbaum; 2003.
- Conger JJ. Alcoholism; theory problem and challenge: II. Reinforcement theory and the dynamics of alcoholism. *Quarterly Journal of Studies on Alcohol*. 1956; 17:296–305. [PubMed: 13336262]
- Eggleston AM, Woolaway-Bickel K, Schmidt NB. Social anxiety and alcohol use: evaluation of the moderating and mediating effects of alcohol expectancies. *Journal of Anxiety Disorders*. 2004; 18:33–49. [PubMed: 14725867]
- Fenigstein A, Scheier MF, Buss AH. Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology*. 1975; 45:522–527.
- Ham LS, Bonin M, Hope DA. The role of drinking motives in social anxiety and alcohol use. *Journal of Anxiety Disorders*. 2007; 21:991–1003. [PubMed: 17275253]
- Ham LS, Hope DA. Incorporating social anxiety into a model of college problematic drinking. *Addictive Behaviors*. 2005; 30:127–150. [PubMed: 15561454]
- Hingson RW, Zha W, Weitzman ER. Magnitude of and Trends in Alcohol-Related Mortality and Morbidity Among U.S. College Students Ages 18–24, 1998–2005. *Journal of Studies on Alcohol and Drugs*. 2009 Supplement No.16:12–20. [PubMed: 19538908]
- Holroyd KA. Effects of social anxiety and social evaluation on beer consumption and social interaction. *Journal of Studies on Alcohol*. 1978; 39:737–744. [PubMed: 672214]
- Kashdan TB, Collins RL. Social anxiety and the experience of positive emotion and anger in everyday life: an ecological momentary assessment approach. *Anxiety, Stress, & Coping*. 2009:1–14.
- Kashdan TB, Roberts JE. Social anxiety's impact on affect, curiosity, and social self-efficacy during a high self-focus social threat situation. *Cognitive Therapy and Research*. 2004; 28:119–141.
- Kashdan TB, Roberts JE. Social anxiety, depressive symptoms, and post-event rumination: Affective consequences and social contextual influences. *Journal of Anxiety Disorders*. 2007; 21:284–301. [PubMed: 16859889]
- Kashdan TB, Steger MF. Expanding the topography of social anxiety. *Psychological Science*. 2006; 17:120–128. [PubMed: 16466419]
- Khantzian E. The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry*. 1985; 142:1259–1264. [PubMed: 3904487]
- Kidorf M, Lang AR. Effects of social anxiety and alcohol expectancies on stress-induced drinking. *Psychology of Addictive Behaviors*. 1999; 13:134–142.
- Leary, MR. Social anxiety as an early warning system: A refinement and extension of the self-presentational theory of social anxiety. In: Hofman, SG.; DiBartolo, PM., editors. *Social Phobia and Social Anxiety: An integration*. New York: Allyn & Bacon; 2000. p. 321-334.
- Leary, MR. The sociometer, self-esteem, and the regulation of interpersonal behavior. In: Vohs, KD.; Baumeister, RF., editors. *Handbook of Self-Regulation: Research, theory, and applications*. New York: Guilford Press; 2004. p. 373-391.

- Leary MR. Motivational and emotional aspects of the self. *Annual Review of Psychology*. 2007; 58:317–344.
- Leary MR, Kowalski RM, Campbell C. Self-presentational concerns and social anxiety: The role of generalized impression expectancies. *Journal of Research in Personality*. 1988; 22:308–321.
- Lewis B, O'Neill K. Alcohol expectancies and social deficits relating to problem drinking among college students. *Addictive Behaviors*. 2000; 25:295–299. [PubMed: 10795955]
- Martin KA, Leary MR. Self-presentational determinants of health risk behavior among college freshmen. *Psychology and Health*. 2001; 16:17–27.
- McCabe SE. Gender differences in collegiate risk factors for heavy episodic drinking. *Journal of Studies on Alcohol*. 2002; 63:49–56. [PubMed: 11925058]
- Mellings TMB, Alden LE. Cognitive processes in social anxiety: The effects of self-focus, rumination, and anticipatory processing. *Behavior Research and Therapy*. 2000; 38:243–257.
- Miller RS. On the nature of embarrassability: Shyness, social evaluation, and social skill. *Journal of Personality*. 1995; 63:315–339. [PubMed: 7782995]
- Morris EP, Stewart SH, Ham LS. The relationship between social anxiety disorder and alcohol use disorders: A critical review. *Clinical Psychology Review*. 2005; 25:234–760.
- NIH. A call to action: Changing the culture of drinking at U.S.Colleges. 2002 [Retrieved July 2, 2007]. from http://www.collegedrinkingprevention.gov/NIAAACollegeMaterials/TaskForce/TaskForce_TOC.aspx.
- Neighbors C, Fossos N, Woods BA, Fabiano P, Sledge M, Frost D. Social anxiety as a moderator of the relationship between perceived norms and drinking. *Journal of Studies on Alcohol and Drugs*. 2007; 68:91–96. [PubMed: 17149522]
- Raudenbush, SW.; Bryk, AS. Hierarchical Linear Models. Thousand Oaks, CA: Sage; 2002.
- Raudenbush, SW.; Bryk, AS.; Congdon, RT. HLM Version 6.34g. Lincolnwood, IL: Scientific Software International; 2008.
- Reis, HT.; Gable, SL. Event-sampling and other methods for studying everyday experience. In: Reis, HT.; Judd, CM., editors. *Handbook of research methods in social and personality psychology*. New York: Cambridge University Press; 2000. p. 190-222.
- Reno RR, Kenny DA. Effects of self-consciousness and social anxiety on self-disclosure among unacquainted individuals: An application of the social relations model. *Journal of Personality*. 1992; 60:79–94. [PubMed: 1560333]
- Rohsenow DJ. Social anxiety, daily moods, and alcohol use over time among heavy social drinking men. *Addictive Behaviors*. 1982; 7:311–315. [PubMed: 7180628]
- Sher K, Levenson R. Risk for alcoholism and individual differences in the stress-response-dampening effect on alcohol. *Journal of Abnormal Psychology*. 1982; 91:350–367. [PubMed: 7142573]
- Shiffman, S. Real-time self-report of momentary states in the natural environment: Computerized ecological momentary assessment. In: Stone, AA.; Turkkan, JS.; Backrach, CA.; Jobe, JB.; Kurtzman, HS.; Cain, VS., editors. *The science of self-report: Implications for research and practice*. Mahwah, N.J: Lawrence Erlbaum; 2000. p. 277-296.
- Stewart SH, Morris E, Mellings T, Komar J. Relations of social anxiety variables to drinking motives, drinking quantity and frequency, and alcohol-related problems in undergraduates. *Journal of Mental Health*. 2006; 15:671–682.
- Swendsen JD, Tennen H, Carney MA, Affleck G, Willard A, et al. Mood and alcohol consumption: An experience sampling test of the self-medication hypothesis. *Journal of Abnormal Psychology*. 2000; 109:198–204. [PubMed: 10895557]
- Tennen, H.; Affleck, G.; Armeli, S. Daily processes in health and illness. In: Suls, J.; Wallston, K., editors. *Social psychological foundations of health and illness*. Malden: Blackwell Publishing; 2003. p. 495-529.
- Thomas SE, Randall CL, Carrigan MH. Drinking to cope in socially anxious individuals: A controlled study. *Alcoholism: Clinical and Experimental Research*. 2003; 27:1937–1943.
- Tran GQ, Haaga DAF, Chambless DL. Expecting that alcohol use will reduce social anxiety moderates the relation between social anxiety and alcohol consumption. *Cognitive Therapy and Research*. 1997; 21:535–553.

Figure 1.
Number of evening drinks as a function of dispositional social anxiety and embarrassing event occurrence.

Table 1

The association between social anxiety, embarrassing events, and drinking

Outcome Measure	Unstandardized coefficients (SE)		
	Embarrassing event ^I	Social Anxiety	Social Anxiety × Embarrassing Event
Same day drinking	-.36 (.45)	-.03 (.03)	.02 (.04)
Same evening drinking	.16 (.13)	.02 (.01)*	-.02 (.01)**
Next day drinking	.42 (.54)	.00 (.04)	-.01 (.04)
Next evening drinking	.18 (.16)	.01 (.01)	-.01 (.01)

Note. Gender, year in school (freshmen vs. other), day of week (weekend vs. weekday) were controlled for in all models.

^I Dummy coded: 0 = event occurred, 1 = event did not occur

* $p < .10$,

** $p < .05$